Wheelabrator Saugus IWPS Process Description

Transmittal No. W150641

Landfill Pump Stations

The landfill pump stations deliver raw leachate to the IWPS by pumping sequentially, alternating every 2 or 3 minutes for each pump. There are three pump stations, each delivering 100 – 150 gallons per minute, when operational. The pump stations operate continuously and are only taken out of service when maintenance is necessary.

Control valves govern whether the raw leachate flows to the IWPS or is discharged directly to sewer. The wastewater characteristics of the raw leachate are all below the Lynn Water & Sewer Commission's sewer discharge limits which allows for direct discharge of the raw leachate, without pretreatment.

Hydrogen Peroxide Injection

When raw leachate is drawn from the landfill, the Oxidation/Reduction Potential (ORP) is -150 to -200 millivolts. Under these anaerobic conditions, iron is dissolved and exists as ferrous iron. When an oxidizing agent is added to the raw leachate and the ORP is raised to a positive level, the ferrous iron oxidizes to ferric iron and because it is highly insoluble, it precipitates out of solution. Jar testing has shown that injecting approximately 25 to 45 parts per million (PPM) hydrogen peroxide will oxidize all ferrous iron to ferric iron in raw leachate from this landfill just prior to flocculation and clarification. The hydrogen peroxide is injected into the raw leachate force main approximately 100 feet upstream of the flash mix section of the flocculation chamber. The hydrogen peroxide shall be delivered from 55 gallon drums using a positive displacement pump designed specifically for this application.

Anionic Polymer Injection

Further jar testing has shown that the addition of an anionic polymer at concentrations between 0.5 and 1.0 PPM greatly enhances the settleability of the solid ferric iron particles during the clarification stage of the IWPS. The polymer is injected into the raw leachate as it enters into the flash mix section of the flocculation chamber. The diluted polymer shall be prepared from concentrate daily and delivered from a day tank using a positive displacement pump designed specifically for this application.

Flash Mix/Flocculation Tank

The flash mix/flocculation tank is divided internally into two compartments, a flash mix compartment and a flocculation compartment. (In the Process & Instrumentation

Diagram they are shown as separate units for ease of understanding the block diagram.) The raw leachate enters the flash mix compartment where it is intimately mixed with the anionic polymer by a fast speed mixer.

The wastewater then leaves the flash mix compartment and enters the flocculation compartment where the mixing of the waster water continues by use of the flocculation mixer. This mixing controls the collision of the smaller particles in the wastewater into a larger, more settleable floc. The speed of the flocculation mixer is adjustable to control the settling characteristics of the floc. The wastewater containing this larger floc passes under a baffle in the flocculation compartment prior to entering the lamella separator.

Lamella Clarifier Tank

The flocculated wastewater enters the lamella separator and is distributed through feed distribution ducts located on both sides of the lamella plates. The liquid/solids stream then enters each plate chamber from the side near the bottom section of the lamella plates and flows upwards between the plates. As the flocculated water flows upwards, the solids settle downward by descending a short distance onto the surface area provided by the plates. The solids continue to slide down the lamella plates and fall into the collection hopper. The clarified water flows upwards and leaves the top of the lamella separator through orifice holes in the adjustable weir plates on each side of the lamella.

The collection of the solids in the collection hopper compresses the water from the sludge to produce a more concentrated liquid sludge. The sludge shall be removed from the hopper on a daily basis and drained into a sump in the wastewater treatment area.

The clarified water leaves the lamella and is directed to the Treated Water Tank.

Sludge Sump

The sludge slurry collected in the sludge sump is periodically pumped into the incinerator portion of the main plant facility and deposited in the quench pit where it will mix with bottom ash, the product of incineration, and removed from the process to be discarded in the landfill. The sludge will contain only ferric hydroxide solids. No toxic metals enter the wastewater treatment system.

Treated Water Tank

Treated wastewater collected in the treated water tank is either distributed to the wastewater tank for use in making up lime slurry for the Wheelabrator's incinerator process, used as wash down water or as cooling water in the SDA where hot gasses are routed for emissions scrubbing.

Alternatively, when treated wastewater is not required, the treated water tank will be pumped to sewer. Flow rate and pH will be monitored just prior to sewer discharge.

Alternate use of the IWPS

Plant water which is used for washing down equipment during power plant outages shall be sent to the IWPS for cleansing and returned to the waste water tank for further use during the outage. 4 to 6 outages are typically scheduled per year. During the outage period (approximately 5 to 10 days) the untreated raw leachate will be sent directly to sewer.

City Water

City water shall be used to flush the IWPS completely following each application of plant water processing or Raw leachate processing.

Instrumentation

Flow rate shall be measured and recorded for the following processes:

1. IWPS influent
2. IWPS effluent to Waste Water Tank
3. Raw and/or treated leachate discharged to sewer

pH shall be measured and recorded for the following process:

1. Raw and/or treated leachate discharged to sewer.